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Optimal individual competition calendar in biathlon (the case of elite female athletes)

Abstract. ***Purpose:*** *optimization of highly skilled female biathlete preparation on the basis of creating individual competition calendars.* ***Material and Methods:*** *analysis of scientific-methodical literature; theoretical methods of scientific cognition; methods of mathematical statistics.* ***Results:*** *optimum number of starts necessary for qualitative preparation of female biathletes for the season major competition has been determined. It has been determined that in case of the season major competition to be held in February after 6 stages of the World Cup, the optimum number of starts is 13–15, and 27–30 per season (total number of available starts 34). When the season major competition is planned for March after 8 stages of the World Cup, then the average number of starts is 21 (the range from 18 to 25). Average number of starts in a season is 30 during the competitive period (the range from 24 to 34).* ***Conclusions:*** *the main criterion in creating individual competition calendars is the number of starts before the season major competition.*
Keywords: *biathlon; individual competition calendar; season major competition.*

Introduction. The aspiration to a wide use of the competitive practice, including in biathlon is a distinctive feature of modern sport. On the one hand, it was promoted by the extension of the international competitive program due to the expansion of the World Cup (WC) and the Cup of IBU, and also the creation from them a rigid structure with the whole quota system and admissions [1; 2] which doesn't give the chance to get on big international competitions to poorly trained sportsmen. On the other hand, there were various commercial starts and shows in the international competitive calendar, in which organizers try to recruit the leading biathlonists. In total the competitive calendar extended considerably and became more compact that was reflected in the increase in influence of the system of competitions at the strategy of training of biathlonists.

The majority of competitions are considered as an effective remedy of the improvement of different parties of preparedness of sportsmen in the modern system of training of biathlonists which, according to many experts, it is difficult if it isn't impossible to solve training [3–8] as trainings which model conditions of the competitive activity or competitions, create prerequisites what provide the achievement of good results by means of the usual system. At this, expert of the theory of sport advise, don't abuse competitive practice, and to use competition in the system of training of sportsmen only in that volume which will provide the most optimum the maximum preparedness of sportsmen for the main thing for them to start of a season [9–12]. And the same authors note also the return regularity. In particular, according to F. P. Suslov, incomplete adaptation of a sportsman to "factors of a competitive situation and in this regard a natural decrease in efficiency of the competitive activity" occurs at the insufficient competitive practice [13].

According to F. P. Suslov, one of the leading experts of Russia of the theory of sport, the most rigid sports international calendar among all sports is the World Cup in biathlon in which the international calendar and the system of offset "don't provide necessary conditions for management of a condition of sportswear of sportsmen" [12; 13].

The analysis of the competitive calendar of the World Cup which is carried out earlier by the author [14] shows that the creation of its blocks (trimesters) really doesn't consider the number of days which are necessary for adaptation of an organism: both by differences on height, and by time zones. Continuous starts in an emergency phase of adaptation of an organism to mountain or time conditions considerably exhaust an organism of sportsmen and lead to the decrease in the level of physical fitness, especially, in our opinion, it is inadmissible on the eve of the main start of a season. Proceeding from it, the hypothesis was made by the author that the individual thought well over competitive calendar is necessary for a successful performance in the main start of a season (MSS). The author didn't reveal concrete recommendations about this question in scientifically-methodical literature on biathlon [5; 7; 8; 15–19].

Communication of the research with scientific programs, plans, subjects. The direction of the work answers a scientific subject 2.5. "Improvements of the training process in winter sports" by the specialty 24.00.01. – The Olympic and professional sport of the Built plan of the research work in the sphere of physical culture and sport for 2011-2015.

The objective of the research: to optimize training of highly skilled biathlonists on the basis of the creation of individual competitive calendars.

Research task:

1. To carry out the analysis of scientifically-methodical literature concerning the influence of the optimum competitive practice on result of a performance in the main start of a season.
2. To analyze the participation leaders of the world biathlon in the competitive program of the World Cup on biathlon.
3. To define the optimum number of starts in a season which provide a gain of medals in MSS (the World Cup, the winter Olympic Games).

Material and methods of the research. In the work such methods of the research were used: analysis of scientifically methodical literature, theoretical methods of scientific knowledge (supervision, generalization, analysis and synthesis), methods of mathematical statistics.

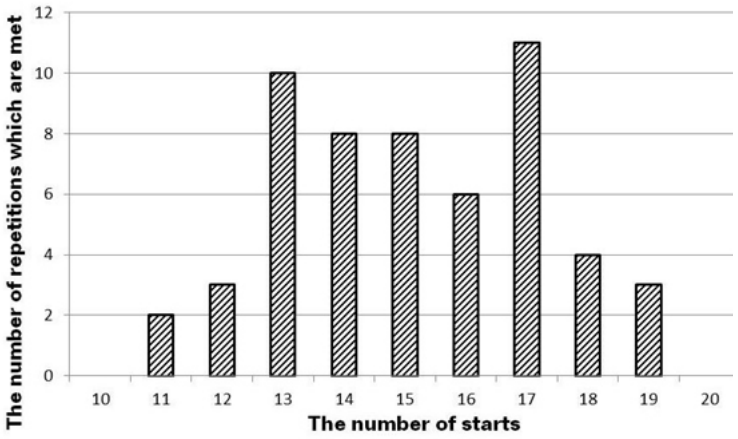
It was analyzed more than 3300 protocols of competitions of stages of World Cups among women, the World Cups and the winter Olympic Games from 2005/2006 to 2014/2015 sports seasons, and also individual plans of training of sportswomen of the women's national team of Ukraine and their performance in 2007-2015.

Results of the research and their discussion. The competitive calendar of WC from 2007 till 2015 which covers the competitive periods, can be divided into two options accurately. The first – when MSS is carried out after six stages of WC

and is placed at the beginning or in the middle of February. The second – when MSS is carried out after the eight stages of WC and is placed in the first half of March.

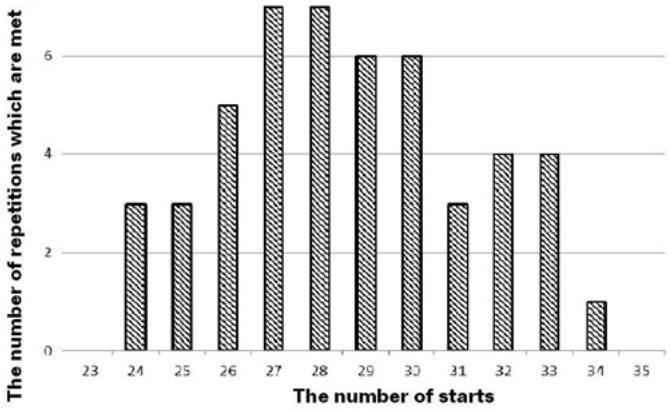
We carried-out the analysis of performances of champions and prize-winners of the World Cups, winter Olympic Games and the main exam of the World Cup in the international sports calendar in sports seasons which provide a gain of prize-winning places from 2006 till 2015.

The analysis of speech of sportswomen in competitions during the season and comparison with their performance in MSS after the mathematical processing by statistical methods demonstrates that the optimum number of starts before MSS on average are 15 starts with a range from 11 till 19 starts when carrying out MSS in February (pic. 1).



Pic. 1. The number of starts in which the leading biathlonists took part before MSS (at 6 stages of WC before MSS)

It is possible to recognize an optimum from 13 to 15 starts as 16–19 is necessary those sportswomen who "close" not only individual types of the program, but also involved in all relay disciplines. In total during the season the leading sportswomen start on average 29 times with a range of 24-34. Most often the range from 27 to 30 starts meets and it is possible to recognize it optimum by a quantity (pic. 2).



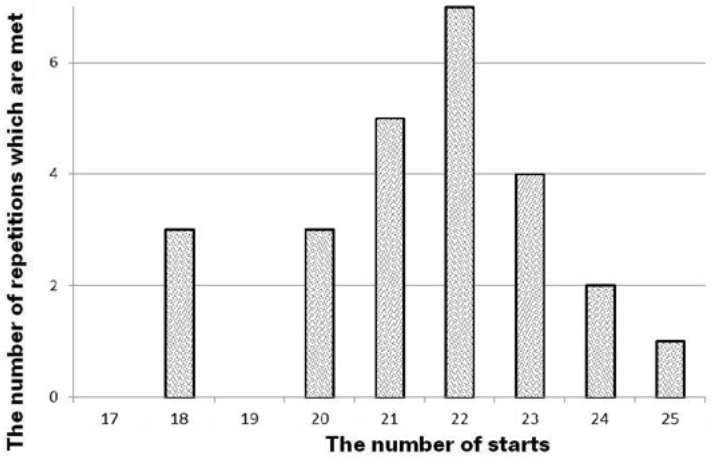
Pic. 2. The number of starts during the season in which the leading biathlonists took part at 6 stages of WC before MSS

The average number of starts is 21 at the range from 18 to 25 when carrying out MSS in March (8 stages of WC before MSS) (pic. 3). In total the leading biathlonists carry out on average 30 starts in the competitive period at the range from 24 to 34 (pic. 4).

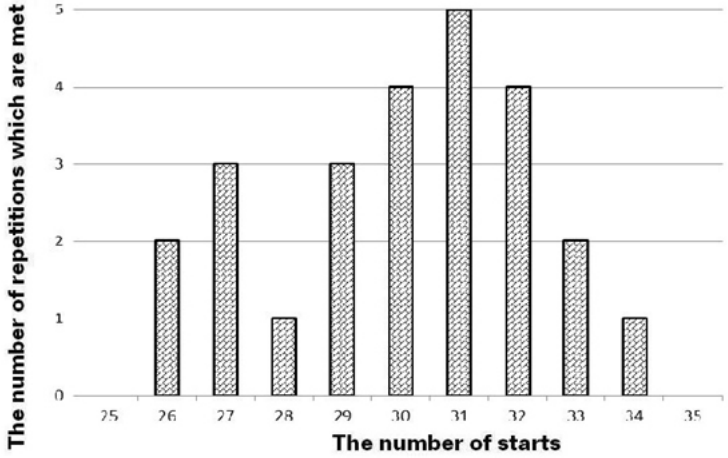
The number of starts before MSS and during the season in general depends not only on the level of sports skill of biathlonists, but also on the level of the rest of a national team to whom they belong. For example, Kaisa Makarainen (FIN) and Teja Gregorin (SLO) have much less of starts as they almost don't participate in relay competitions (there are no 4 women in a team) or Darya Domracheva (BLR) doesn't take part in mixed relays (there is no competitive men in a team). At the same time the leading sportswomen of Ukraine, Germany, Norway, France and Russia take part practically in all relays. Considering this factor, as the optimum number of starts is possible to recognize an indicator, it is a little lower than an average.

Sports annual preparation in biathlon is accurately divided into three periods. The preparatory period which lasts from May to November is more exact to the first official start (it is most often the end of November or the beginning of December). The competitive period – from the first official start, until the end of a sports season (the end of March or the beginning of April). April is a transition period.

The analysis of individual plans of training of sportswomen of the women's national team of Ukraine and their



Pic. 3. The number of starts in which the leading biathlonists took part before MSS (at 8 stages of WC before MSS)



Pic. 4. The number of starts during the season in which the leading biathlonists took part at 8 stages of WC before MSS

performance of the period of 2007-2014, and also protocols of competitions of this time allows drawing a conclusion that the most successful speeches of biathlonists in seasons were after instead of 20–23 starts in the preparatory period (2006–2008) sportswomen took part only at 10-12 control trainings. After months of preparation starts were distributed as follows: May – no starts, June – one, July – one-two, August – two-three, September – 3–4, October – no starts, November – 2–3. The redistribution of starts in an annual cycle of preparation took place, namely: the number of starts decreased in the preparatory period, but the aspiration to a maximum increased in the competitive period.

The analysis of speech of sportswomen of Ukraine in competitions (tab. 1) and comparisons with their performance in MSS shows that leaders of the Ukrainian national team before MSS have a number of competitions on average of 15 starts with a range from 13 to 17, and 29–32 starts during the season in general that completely answers the optimum number of starts of leaders of the world biathlon when carrying out MSS in February.

Thus, the leading biathlonists carry out 10–11 starts in the preparatory period and 29–32 starts in the competitive period. 19 starts of Olena Pidgrushna before WC-2013 though led to a considerable success, it is possible to consider an exception. Perhaps it is necessary to reduce the number of starts before the main start of four years till 9-12 with the purpose to come "fresh" to the most necessary distances, but then the basic work has to precede it within about five and more years (tab. 1).

The decrease in a competitive loading without a good basic work doesn't bring a result. The smaller number of starts to responsible competitions doesn't allow to provide reliable launching sites on MSS and sure firing.

When carrying out MSS in March the number of starts before MSS averages is 22 starts with a range from 18 to 23 at leaders of the Ukrainian national team. In total during the season – is 26–31 starts in the competitive period. 26 starts are executed by Semerenko Valya before the World Cup – 2015 it is possible to call an obvious search. It is possible to assume that a "flat" character of a place of the championship, but not a competently planned individual competitive calendar allowed to act successfully to the sportswoman on WC-2015.

The number of starts a little less maximum is optimum. So, from 33–34 starts within WC and 2–3 selection starts in the territory of Ukraine of the sportswoman, passing one stage of WC, but taking part in WC or Student Games, during the season takes part at 26-31 start, winning thus premium medals on MSS.

From tab. 1 it is visible that such regularity is traced only at leaders, and other members of a national team of Ukraine

Table 1

The number of starts in the competitive period at sportswomen of a national team of Ukraine

№	S.N.	Sports seasons, when MSS in February						Sports seasons, when MSS in March		
		2006–2007	2007–2008	2008–2009	2009–2010	2012–2013	2013–2014	2010–2011	2011–2012	2014–2015
1.	Pidgrushna O.	11/24	–/13	11/21	15/29	19/32	12/17	18/26	22/24	
2.	SemerenkoVita	16/30	13/24	15/31	15/31	17/30	9/21	22/31	22/31	
3.	Semerenko Valya	20/24	13/25	15/31	14/28	15/29	15/28	23/30	19/26	26/36
4.	DzhimaY.		8/13	6/14	3/11	15/27	13/25	17/21	12/16	22/28
5.	Burdyga N.					12/16	13/21	10/12	21/28	22/22
6.	Suprun I.	6/10	11/20	11/16	7/7	17/18	15/15	15/20		
7.	Panfilova M.					-/9	10/17			
8.	Bondar Y.					11/16	9/13			15/18
9.	Khvostenko O.	14/29	15/26	14/21	12/24				12/14	
10.	Vaygina L.	4/4	10/19	12/13	10/11					
11.	Varvinyets I.					–/8	10/16			15/21
12.	Abramova O.						13/4			20/26
13.	Zhuravok Y.						5/9			13/18

Note. *In a numerator – the number of starts before MSS, in a denominator for the whole competitive period.*

have a total of starts in seasons obviously insufficiently. Except the limiting factors in the form of quotas, the number of starts directly depends on the level of sports skill of biathlonists, depending on participation of the sportswoman in pursuit after a sprint race.

The reduction at some sportswomen of competitive starts in a season can be connected both with the tactical decision, and with the temporary circumstances (illness, disqualification, missing to the main structure of the national team, desire to finish an unsuccessful sports season or sports career in the middle of a season). However before the MSS or the main start of four years seldom who finishes sports career. Therefore the main criterion of an individual competitive calendar is a density of competitive starts before MSS, but not during the season in general.

Conclusions:

1. The number of starts which fall on each sportsman in a season, has to be optimum and accurately dosed for the achievement of the best sports result on the most responsible starts of a season or four years. Thus the main criterion of an individual competitive calendar is a density of competitive starts before MSS.

2. When carrying out MSS in February (after 6 stages of WC), tha optimum number of starts before MSS is the range from 13 till 15, and during the season in general from 27 till 30, at the greatest possible 34 starts.

3. When carrying out MSS in March (after 8 stages of WC), the average number of starts is 21 in the range from 18 till 25. In total there are on average 30 starts in the range from 24 till 34 during the season in the competitive period.

4. Leaders of a national team of Ukraine have a number of starts, both before MSS, and during the season in general, answers an optimum quantity.

5. The second cast of a national team of Ukraine has obviously not enough starts for high-quality preparation for the main start of a season in the competitive period.

Prospects of the subsequent researches in this direction is a creation of optimum individual calendars of competitions taking into account geographical conditions, places of competitions for an effective admission to the main start of a season (WOG, WC).

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